Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A separator for batteries comprising a multi component composite membrane, wherein the multi-component composite membrane comprises active layers and support layers, wherein a support layer is located between active layers, wherein the active layers have pores having a pore size and a pore distribution, ~~and~~ wherein the support layer has pores having a different pore size and a different pore distribution, and wherein the membrane includes no aromatic polymer comprising thioether.

2. (Previously presented) The separator for batteries as claimed in claim 1, wherein a component of the support layer is at least one polymer selected from the group consisting of high density polyethylene, low density polyethylene, linear low density polyethylene, polypropylene, crystalline polypropylene, polyethylene-propylene copolymer, polyethylene-butylene copolymer, polyethylene-hexene copolymer, polyethylene octene copolymer, polystyrene- butylene-styrene copolymer, polystyrene-ethylene butylene-styrene copolymer, polystyrene, polyphenylene oxide, polysulfone, polycarbonate, polyester, polyamide, polyurethane, polyacrylate, polyvinylidene chloride, polyvinylidene fluoride, polysiloxane, polyolefin, ionomer, polymethylpentene, and hydrogenated oligocyclopentadiene (HOCP), and a derivative thereof.

3. (Previously presented) The separator for batteries as claimed in claim 2, wherein the crystalline polypropylene has one or more physical properties selected from the group consisting of a density of 0.905 g/ cc or more, a melting point of 164°C or higher, a

crystallization temperature of 125°C or higher, a crystallinity of 50% or greater, an isotacticity of 96% or greater, and an atactic fraction of 5% or less.

4. (Previously presented) The separator for batteries as claimed in multi component composite membrane according to claim 1, wherein a the pore size of a-the support layer ranges from 0.001 to 10 μm.

5. (Previously presented) The separator for batteries as claimed in claim 1, wherein a thickness of the support layer ranges from 1 to 50 μm.

6. (Previously presented) The separator for batteries as claimed in claim 1, wherein a component of the active layers is one or more polymers selected from the group consisting of polyethylene, polypropylene, polyvinylidene fluoride, polyvinylidene fluoride hexafluoropropylene copolymer, polyethylene oxide, polypropylene oxide, polybutylene oxide, polyurethane, polyacrylonitrile, polyacrylate, polyacrylic acid, polyamide, polyacrylamide, polyvinylacetate, polyvinylpyrrolidone, polytetraethylene glycol diacrylate, polysulfone, polyphenylene oxide, polycarbonate, polyester, polyvinylidene chloride, polysiloxane, and polyolefin ionomer, and a derivative thereof.

7. (Previously presented) The separator for batteries as claimed in claim 6, wherein a solvent for the component of the active layers is one or more solvents selected from the group consisting of 1-methyl-2-pyrrolidone (NMP), acetone, ethanol, n-propanol, n-butanol, n hexane, cyclohexanol, acetic acid, ethyl acetate, diethyl ether, dimethyl formamide (DMF), dimethylacetamide (DMAc), dioxane, tetrahydrofuran (THF), dimethyl sulfoxide (DMSO), cyclohexane, benzene, toluene, xylene, and water, and mixtures thereof.

8. (Previously presented) The separator for batteries as claimed in claim 1, wherein the pore size of at least one active layer is equal to or less than 10 μm.

9. (Previously presented) The separator for batteries as claimed in claim 1, wherein a thickness of at least one active layer ranges from 0.01 to 20 μm.

10. (Previously presented) The separator for batteries as claimed in claim 1, wherein air permeability of the multi-component composite membrane is equal to or less than 7,000 sec/100 cc.

11. (Previously presented) The separator for batteries as claimed in claim 1, wherein a wet-out rate of the multi-component composite membrane is equal to or less than 30 seconds.

12. (Previously presented) The separator for batteries as claimed in claim 1, wherein the multi-component composite membrane comprises two or more active layers and one or more support layers, and the composite membrane has a structure of triple or multiple layers.

13. (Previously presented) The separator for batteries as claimed in claim 2, wherein the support layer is blended or laminated with at least one polymer.

Claims 14-15. (Cancelled)

16. (Currently amended) A rechargeable lithium ion battery or a rechargeable lithium ion polymer battery comprising a multi-component composite membrane as a separator, wherein the multi-component composite membrane comprises active layers and support layers, wherein a support layer is located between active layers, wherein the active layers have pores having a pore size and a pore distribution, ~~and~~ wherein the support layer has pores having a different pore size and a different pore distribution, <u>and wherein the membrane includes no aromatic polymer comprising thioether</u>.

17. (Previously presented) A preparation method of a multi-component composite membrane comprising steps of:

a) preparing a precursor film by injection of a polymer, which is used, for a support layer into an extruder;

b) annealing the precursor film at a temperature less than a melting point of the polymer;

c) coating both surfaces of the precursor film with a polymer solution, which is used for an active layer;

d) drying the coated precursor film;

e) low temperature-stretching the dried precursor film at a temperature less than room temperature;

f) high temperature-stretching the low temperature-stretched precursor film at a temperature less than the melting point of the polymer; and

g) heat-setting the high temperature-stretched precursor film under tension at a temperature less than the melting point of the polymer.

18. (Previously presented) The preparation method according to claim 17, wherein the polymer solution of step c) is coated on both sides of the precursor film by dip-coating.

19. (Previously presented) The preparation method according to claim 17, wherein a concentration of the polymer solution of step c) is equal to or greater than 0.01 wt%.

20. (Previously presented) The preparation method according to claim 17, wherein the drying of step d) is performed at a relative humidity ranging from 1 to 100%.

21. (Previously presented) The preparation method according to claim 17, wherein the drying of step d) is performed under saturated vapor pressure.

22. (Previously presented) The preparation method according to claim 17, wherein the drying of step d) is performed under a gas atmosphere selected from the group consisting of nitrogen, oxygen, carbon dioxide, and air atmosphere.

23. (Previously presented) The preparation method according to claim 17, wherein an active layer having a thickness in the range of 0.1 to 20 μm is formed through the coating and drying of steps c) and d).

24. (Previously presented) The preparation method according to claim 17, which further comprises the step of applying ion beams to either or both surfaces of the annealed precursor film with reactive gas between the steps b) and c).

25. (Previously presented) The preparation method according to claim 24, wherein the ion beam irradiation is performed by activation of electrons and a gas selected from the group consisting of hydrogen, helium, oxygen, nitrogen, carbon dioxide, air, fluorine, neon, argon, krypton, N_20, and a mixture thereof such that the gas has an energy ranging from 0.01 to 10^6 keV; and irradiating the surface of the precursor film with the ion beams.

26. (Previously presented) The preparation method according to claim 24, wherein the ion beam irradiation amount ranges from 10^5 to 10^{20} ions/ cm^2.

27. (Previously presented) The preparation method according to claim 24, wherein the ion beam irradiation is performed under a gas atmosphere selected from the group consisting of helium, hydrogen, nitrogen, ammonia, carbon monoxide, carbon dioxide, chlorofluoro methane, methane, and N_20 atmospheres, and mixtures thereof.

28. (Original) The preparation method according to claim 27, wherein the flow rate of the reactive gas ranges from 0.5 to 20 ml/minute.

29. (Canceled).

30. (Previously Presented) The preparation method according to claim 24, wherein the ion beam irradiation is performed under a vacuum ranging from 10^{-1} to 10^{-6} torr.

31. (Previously presented) The separator for batteries as claimed in claim 1, wherein the pores of the support layer are formed by a stretching process after orienting a polymer crystalline region in a certain direction and the pores of at least one active layer are formed by a stretching process after forming a polymer film through phase-inversion.

32. (canceled)

33. (Previously presented) A preparation method of a multi-component composite membrane comprising steps of:
a) annealing a precursor film comprising a polymer at a temperature less than a melting point of the polymer;
b) coating both surfaces of the precursor film with a polymer solution, which is used for an active layer;
c) drying the coated precursor film;
d) low temperature-stretching the dried precursor film at a temperature less than room temperature;
e) high temperature-stretching the low temperature-stretched precursor film at a temperature less than the melting point of the polymer; and
f) heat-setting the high temperature-stretched precursor film under tension at a temperature less than the melting point of the polymer.

34. (Previously Presented) The preparation method according to claim 33, wherein the polymer solution of step b) is coated on both sides of the precursor film by dip-coating.

35. (Previously Presented) The preparation method according to claim 33, which further comprises the step of applying ion beams to either or both surfaces of the annealed precursor film with reactive gas between the steps a) and b).

36. (Previously Presented) The preparation method according to claim 35, wherein the ion beam irradiation is performed by activation of electrons and a gas selected from the group consisting of hydrogen, helium, oxygen, nitrogen, carbon dioxide, air, fluorine,

neon, argon, krypton, N_20, and a mixture thereof such that the gas has an energy ranging from 0.01 to 10^6 keV; and the surface of the precursor film with the ion beams.

Claims 37-46. (Cancelled)

47. (Previously Presented) The separator for batteries as claimed in claim 1, wherein the pores of the support layer are formed by a stretching process and the pores of at least one active layer are formed by a stretching process after being formed by a phase-inversion.

48. (Currently amended) A separator for batteries comprising the multi-component composite membrane made by the preparation method of claim 17, wherein the membrane includes no aromatic polymer comprising thioether.

49. (Currently amended) A rechargeable lithium battery comprising the multi-component composite membrane made by the preparation method of claim 17 as a separator, wherein the membrane includes no aromatic polymer comprising thioether.

50-53. (Cancelled)

54. (Currently amended) A separator for batteries comprising the multi-component composite membrane made by the preparation method of claim 33, wherein the membrane includes no aromatic polymer comprising thioether.

55. (Currently amended) A rechargeable lithium battery comprising the multi-component composite membrane made by the preparation method of claim 33 as a separator, wherein the membrane includes no aromatic polymer comprising thioether.

56-58 (canceled)